## CLAIMS

We claim:

1. A dynamic directory of degree of freedom data for elements in a non-conformal mixed-element mesh comprising elements subdividable into tetrahedra, comprising:

a respective degree of freedom value for each element,

wherein the degree of freedom value is current as element subdivision proceeds.

2. The directory of claim 1, wherein the element subdivision is based on the degree of freedom values in the directory, with ordered subdivision beginning with relatively low degree of freedom element subdivision.

3. A tetrahedralization method, comprising at least the steps of:

providing a non-conformal mixed element mesh comprising elements subdividable into tetrahedra, and identifying respective degree of freedom values for the elements in the mesh;

performing element subdivision based on the degree of freedom values of elements in the mesh.

4. The method of claim 3, wherein element subdivision begins with a batch of relatively most-constrained elements.

5. The method of claim 3, wherein element subdivision includes look-ahead.

6. The method of claim 3, wherein the subdivision includes, when multiple subdivisions of an element are possible, applying a subdivision pattern closest to satisfying Dompierre "global numbering" criteria.

7. The method of claim 3, including maintaining degree of freedom data for elements in the mesh.

8. The method of claim 7, including post-subdivision updating of the degree of freedom data.

9. The method of claim 8, wherein degree of freedom data is updated after each element subdivision.

10. The method of claim 8, wherein degree of freedom data is updated after a batch of elements have been subdivided.

11. The method of claim 3, including breadth-first-search subdivision.

12. The method of claim 11, wherein the breadth-first-search subdivision includes generating nearest newly-constrained elements and subdividing all nearest newly-constrained elements before subdividing a neighbor of a nearest newly-constrained element.

13. The method of claim 3, including obtaining tetrahedralized output.

14. A tetrahedralizing filter, comprising:

a receiver for data defined on a non-conformal mixed element mesh comprising elements subdividable into tetrahedra,

a processor for the mesh data, wherein the processor dynamically associates individual to-be-subdivided elements in the mesh with a degree of freedom value in an element-by-element degree of freedom directory;

an element subdivider that discriminates on whether to initiate subdivision or hold subdivision based on the degree of freedom directory, with subdivision

priority to relatively most-constrained to-be-subdivided elements.

15. The filter of claim 14, including a subdivision strategizer.

16. The filter of claim 14, including a dynamic directory.

17. The filter of claim 14, wherein the directory is updated between element subdivisions.

18. The filter of claim 14, including a breadth-first-search subdivider that generates nearest newly-constrained elements and subdividing all nearest newly-constrained elements before subdividing a neighbor of a nearest newly-constrained element.

19. Tetrahedralized output data produced by

providing a non-conformal mixed element mesh comprising elements subdividable into tetrahedra, and generating data defining respective degree of freedom values for the elements in the mesh; and

performing element subdivision based on the degree of freedom values of elements in the mesh, wherein the degree of freedom data is dynamically updated.

20. The tetrahedralized output of claim 19, including a minimal number of, or no, Steiner points.